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force on the 31st July last. The bonus applicable to each particular policy will be calculated forthwith so that it may be appropriated on the 30th June next.

In the case of claims under participating policies by death or endowment happening prior to the 30th June, 1868, the cash value of the bonus to be allotted to such policies will be allowed.

In other cases, the usual options will, on the 30th June next, be afforded to the policy-holders in selecting the modes in which the bonus should be applied.

GENERAL BALANCE-SHEET for 31st July, 1867.

ASSETS.		£	s.	d.
Present Value of Policy Premiums, and Reassurances . . .		3,401,463	5	0
Investments in Funded, Freehold and Leasehold Property . . .		456,525	12	9
Mortgages on Real and Personal Estate . . . . .		340,594	14	0
Loans on Policies on Credit Premiums, etc. . . . .		70,527	16	10
Cash, Bills, Bankers' and Agents' Balances, and Current Premiums .		157,833	19	5
Current Interest on Investments . . . . .		8,318	18	4
		<hr/> £4,435,264		
			6	4
LIABILITIES.				
Value of Sums Assured and Bonus . . . . .		3,590,461	19	0
Value of Annuities . . . . .		100,723	14	0
Sundry Claims and Charges waiting Settlement . . . . .		56,775	0	8
Proprietors' Fund . . . . .		21,712	0	0
		<hr/> £3,769,672		
			13	8
Balance available for present and future Profits and future Expenses . . . . .		£665,591	12	8
		<hr/> £4,435,264		
			6	4

## NOTICES OF NEW WORKS.

*The Insurance Guide and Hand Book: being a Guide to the Principles and Practice of Life Assurance; and a Handbook of the best Authorities on the Science, &c.* By CORNELIUS WALFORD, Barrister-at-Law, Fellow of the Statistical Society of Great Britain, &c. &c. Second Edition. C. & E. Layton.

THIS book has established its *raison d'être* in the way of all others most pleasing to an Author. A second Edition is at all times something more than a compliment; in a case like this, it is an evidence of marked, and, we would add, deserved success. A bulky volume of over 400 pages and of proportionate cost, bearing the somewhat forbidding title of "The Insurance Guide and Handbook," and, though dedicated especially to Insurance Agents, having in reality no natural audience, would at first sight seem little likely so completely to exhaust "a first Edition of some Thousands" as to have been "long out of print" ten years after its publication. Yet such is the fact here, and hence this new issue.

On reading the book, it is not difficult to divine the sources of its popularity. The Author himself says, at page 65, "Writing for a popular purpose, and on a subject which certainly *ought* to be popular, we freely

admit that we have not limited ourselves to such points as Insurance Agents *only* should understand. Acting upon the belief that all that relates to humanity relates to every man, we have assumed a broader basis, and endeavoured to bring together, in these pages, a store of facts and considerations which every man may be the wiser and better for becoming acquainted with." We are accordingly prepared to find much that bears but remotely on the main object of the work, which was to supply "a Guide to the principles of Assurance" and "a Handbook on essential points of practice." The second division, of 85 pages, devoted to "popular notes on the laws of mortality, as bearing upon Life Assurance; also on population and longevity," is of a character especially gossiping. In it are mixed up with facts of undoubted value, such merely curious or amusing matters as causes of death in Royal Circles, length of reign of European monarchs, the voyage of life, marriage and its influences, the hours most fatal to life, suicide, the art of prolonging life, the three celestial gifts—in this case, light, heat and air, longevity of the patriarchs, and the art of enjoying health. There is, however, a more solid reason for the success this book has met with—a success beyond that at which it may be said to have aimed. Many persons who have little to learn from its pages are yet glad to avail themselves of it, as being, in an honourable sense, a kind of *omnium gatherum* of facts and opinions, conveniently grouped, drawn chiefly from writers of authority, to whose works reference is always made with scrupulous fidelity. Encyclopædias and vade-mecums will always be dear to that numerous class who dislike the labour of original research.

The book comprises six divisions, including the one just spoken of; and although it is beyond our scope to enter into any elaborate analysis of their contents, it may be useful to give their titles and to describe briefly their subjects, the more so that the book, although containing a full index, has no Table of Contents.

Division I. contains an account of the early History and progress of Insurance—Marine, Casualty, Fire, and Life—and may be shortly described as an attempt to trace the progressive development of the Insurance principle from its germination in the very dawn of our modern civilization, through its various inchoate and speculative stages, to its luxuriant growth in that era of spasmodic energy, the reaction from which may be seen in the melancholy list of abortions and decays of nature, or, in plain words, of unsuccessful Companies, with which the chapter ends.

Division II., besides those merely amusing matters already noticed, deals with the really important subjects of mortality, in reference both to age, condition, and locality; of deaths, both as to their ordinary causes and their fluctuations with the political condition of the country—with its years of peace and plenty, of war and scarcity.

Division III., which treats of the theory and practice of Life Assurance and commences at page 149, is the real beginning of the serious purpose of the book. Having traced with much elaboration, interest and success, the history and characteristics of the various tables of mortality, which, as the author says truly, but with some confusion of metaphor, are "the key-stone or pivot upon which the whole science of Life Assurance hinges," and having traced also the history, if the expression may be allowed, of the rate of interest, and its bearing on the financial operations of Assurance Companies,—that is, having treated of "the two fundamental elements of Lives and money, upon which," the author again says truly, but this time

with some confusion of grammar, "the structure of Life Assurance has, and must, continue to be raised,"—he discusses, with both fairness and clearness, Life Assurance in its modern practice and in regard to the improvements and expansions of which he thinks it capable; and then ends, somewhat oddly, with a chapter on "rates of premiums; method of determining them; and tables of rates of all the existing Offices."

Division IV. relates to "Bonuses: how derived, and the proportions and manner of declaring them"; and we are glad to bear testimony to the care with which the Author states and enforces the sound and judicious views of various writers on the vital subjects of valuation and division of apparent surplus.

This division concludes with a "Bonus Table," the object of which is very laudable; but which, by attempting too much, has become positively misleading. The Table includes columns giving the date of the first division of profits, the proportion given to the assured, and how often the profits are divided; and these facts, although subject to constant changes, have a degree of permanent value, as showing the practice of the Offices at a given time. But the facts given are not accurate, even as relates to so simple a matter as the proportion of the profits returned to the assured. For example, when it is stated in the case of one Office that two-thirds only of the profits are allotted to the assured, nothing is added to remind the reader that the profits here meant are the *gross profits*, before any deduction is made for the expenses of management; and that the two-thirds of these gross profits will be a much larger proportion of the net profits. Nor is there any intimation given that in many instances the assured receive the stated proportion of the profits *from every source*, while in others they only receive a proportion of the profits arising from the participating policies—the difference often being very material. There are many obvious errors and inconsistencies in the column "amongst whom the profits are divided"; but the next one, "Principle of Division," is so very inaccurate, that we are forced to the conclusion that the statements it contains must have been arrived at by pure conjecture. To give this information with the slightest approach to accuracy would require a long chapter to be devoted to the subject; and even if this were done, the information would be of very doubtful value, on account of the constant changes which are always taking place in the methods of division of profits. Notwithstanding all that has been written on the subject, we are of opinion that no complete and impartial account has yet appeared of the various methods of division of surplus actually in use; and such an account is much to be desired. Lastly, in the column "How the profits are applied," there is no hint given that several Offices, which are returned as allowing the option of addition to the sum assured or reduction of premium, require the option to be exercised on one occasion only—at the date either of effecting the policy, or of the first division of profits—while others allow the option to be exercised at every division of profits; and some again allow the reversionary bonuses to be surrendered *at any time* for the equivalent value in cash or reduction of premium. On the whole, it would be perhaps better that this table should be entirely omitted. If retained in a future edition, it should certainly be re-cast.

Division V. treats of "Life Assurance as an investment, including the purchase of Life Policies, and speculations in Insurance Shares," and embodies various annuity and other tables, besides one which is open to

even greater objection from the evanescent character of its facts than the table concerning Bonuses just noticed—viz., a table of the Capital of Insurance Companies and of the “present price” of their Shares! Life Assurance as an Investment is a subject which has never been treated in the serious and exhaustive manner its importance deserves. The Author in his Chapter on this question gives a table comparing the position of two men of the age of 30,—one of whom accumulates £5 per annum at compound interest, whilst the other invests the like Annual Sum in insuring his life for £200, with profits—during each of the 34 years which measure their “Expectations.” To the one he allows 4 per Cent compound interest, and to the other a fixed and not immoderate rate of bonus arising quinquennially; and the comparison so brought out shows a balance, large at the beginning and, though of course gradually diminishing, continuing in favour of the Policyholder during the whole of the period, excepting the last 4 years. Now, regarding this statement as that of an account closed by death, which is of course the assumption, it is conclusive enough so far as it goes. But it unfortunately stops at the very point where the difficulty begins, *i.e.* when the accumulated premiums begin to exceed the amount payable under the Policy. The merits of Assurance are clear enough to those who receive the proceeds of early claims; the long lives alone can be the grumblers, and it is with them that the controversy has to be carried on. By stopping where it does, this table gives a colour to the notion which these commonly hold, that when more has been paid than can be received, the Insured has made a bad investment. It is unnecessary to say here how wide this is of the truth; the only question is as to how it is to be shown that it is not true. The difficulty is to make men see, or rather perhaps acknowledge, after the event, that they are properly made to pay for the risk of a contingency which has not happened. With a yearly fire risk, or accidental risk, no such difficulty is experienced; nor would any probably be felt with regard to life assurance, if what may be termed the *natural system of assurance* were the custom, that is, if the current risk only of each year were paid for by the variable premium necessary to cover it, in which case, we may observe in passing, life insurance would cease to be an “investment.” It would then be seen by the most obtuse person that at the end of the year he had had the full equivalent for his money, even though the event for which it was paid had not happened. Hence we should be glad to see this Table differently constructed. The most intelligible plan would perhaps be that which should show year by year the accumulation of the natural year-to-year premium for the difference between the amount of the assurance and the amount of the accumulated investment. When, for example, these balance each other, as in the table they do practically at the end of 31 years, it is not accurate to say that then the two plans have been equally advantageous, and still less, as the Author does, that from that point the advantage is in favour of the ordinary investor. Surely something is due for the guarantee during all these years for the payment in case of death of sums ranging from £195 in the first year to £12 nearly in the 30th! If the value of such guarantee be either added to the amount of the assurance, or, still better, deducted from the amount of the accumulated investment, the balance would be at once destroyed. If the same plan were followed in subsequent years, the fact would be apparent, which nobody who understands the subject will doubt, that except in the most extreme cases Life Assurance can never be a bad investment.

Division VI. is a miscellaneous one, having chapters on the selection of an Office by an Agent or by an intending insurant, on the working of Assurance Agencies, and on the publication of accounts and the legislation needed for Assurance Offices, about which we would make but this remark, that never more than now has interference on the part of the state been needed, in order to enforce such a measure of publicity as would enable persons of ordinary intelligence to judge of the solvency of the Companies to which they have committed their interests. The state of things existing with regard to Life Assurance Companies has no parallel. The public have by the nature of things to repose in them great and, in theory at least, perpetual confidence; and they, in turn, too often treat the public with the most studied and persistent secrecy. None but Companies that fear the light would do other than welcome an impartial parliamentary action which, whilst leaving them unfettered in the conduct of their business, would compel them to state its results with such clearness and precision as would at least rob dishonesty of its congenial darkness.

On all the subjects embraced in these divisions, little, whether of theory or of practice, is omitted from consideration; and the Author rarely departs from his custom, indicative at once of modesty and good sense, of supplementing his own remarks with copious quotations from the writings of others. It is however one of the misfortunes incident to a second Edition of a work like this, that many of the authors quoted as authorities have by lapse of time ceased to be such, even if the title fairly belonged to them in the first instance, as it is that no reference is made to the writings of the many able men who have in the interval between the two Editions brought themselves to the front.

Indeed, we have throughout our perusal of the book been constantly reminded of the little that has been done to bring its facts and opinions down to the present time. We are told, for example, at page 199, that "The Amicable still remains secure in its antiquity," and, at page 309, that "the Family Endowment and the Britannia apply their Bonuses to reduction of premiums only," though elsewhere these Offices are all properly treated as non-existent. Again, at page 172 we are told, on the authority of Mr. Sang, but in spite of the researches of Messrs. Bailey and Day, that a greater share of health and longevity "is enjoyed by the working population (the middle classes generally) than by those who have been more favoured with the smiles of fortune." We still read in numerous places of *Dr. Milne* and *Dr. Griffith Davies*, misnomers, speaking of unacquaintance, that ought not to have escaped any kind of revision, whilst there remain all the old printer's mistakes, of which the whole book is more than enough full. In a second Edition, one would scarcely expect to see it gravely stated, as it is on page 212, that the Globe Office "invested its Capital in the funds at a period when they were low, and thereby obtained very nearly *two millions* for *one*," or that in Banks, unlike other Joint Stock Companies, "the liability of the Shareholders is unlimited." The Chapters on population, &c., in Division II. have confessedly not been revised on the last Census returns, the results of the former Census being in the opinion of the Author sufficient for his purpose. If, however, it be his purpose to leave on the mind intelligent ideas of facts as they now are, we take leave to differ from him. It is manifest that his figures relating to the population have lost all their original value, except as mere historical numbers. They no longer refer to an existing or even a proximate state of things. In a modified

sense, the same may be said of those relating to mortality. It is no longer accurate, for example, to say that the mortality of London is at the rate of 25 per 1000, nor that that of England and Wales is at the rate of 23 per 1000, both rates having undergone appreciable diminution in recent years.

We are reminded by what we have now said about the vanished trustworthiness of these figures, that even on their own basis they are not always to be depended on. To take two or three examples. At page 73, the mortality of London is given as 1 in 41; at page 75, as 1 in  $20\frac{3}{4}$ ; and at page 117, of 1 in 39. Again, at page 82 the deaths in childhood are stated as 1 in 171 births registered, whilst at page 139 they are given as 1 in 200 children born alive. And again, at page 130, "physicians who practise" are said to be "shorter lived than almost any other of the professional classes," although on the very next page there is quoted Dr. Guy's dictum that medical men occupy the first position, in respect of longevity, of the three learned professions.

There are other blemishes of a verbal and numerical kind. At page 56, in a table of the number of Companies formed under the Act of 1844, the additions of two columns of figures that really add up to 49 and 243 respectively are printed as 27 and 258; at page 166, in the comparative table of "Expectations," the expectation at age 65 by the Equitable Experience is given as 19.4 instead of 11.4; and at page 176, in a table of decrements according to the English life tables No. 1, the number of males who die in the 6th year of life out of 512 born is given as 56 instead of 5. Again, at page 358, £397 is stated to be the value of a reversion to £1000 on the death of a life aged 53, the 53 being a mistake for 50; and at page 334 there is an error of like kind, the value of a reversion to £1,000,000 at age 30 being stated as £446,750, whereas, by the table of mortality and at the rate of interest assumed, it is the value of such a reversion at age 35. These are examples which have mostly caught the eye and are by no means the fruit of diligent search.

The Author does not write as an actuary, and is, therefore, not to be judged by the severe rule which would rightly be applied to one having more pretensions. But we notice some expressions which are something more than mere verbal errors, and which should have been corrected in a second edition. Thus, at page 153, the term "mean duration of life" is defined as if it were applicable to the period of birth only, the Author seeming to be unaware that it is another expression for the "expectation of life." Again, the explanation, at pages 151-2, of the graduation of mortality tables is very imperfect, and the illustration from the Northampton Table unfortunate, the error in the construction of that Table being one of principle, which cannot be remedied by graduation. At page 251 the supposed use of the term of the expectation of life in the construction of premiums is altogether wrong; at pages 303-4, in describing the mode of distributing the Bonus as a percentage on premiums paid, the cash allotment is treated as the Reversionary addition that would be made to the Policies; and lastly, at page 355, in dealing with modes of valuing a Policy for purchase as an investment, the Author gives as a correct method one by which the difference between the *gross* premiums at the time of purchase and at entry is multiplied into the annuity, which, it is obvious, is correct only when the purchaser intends to effect an insurance on the life in question, but has the opportunity of purchasing an existing policy.

We should be sorry to end here. The defects we have pointed out are after all but specks in the sun. Though they sometimes dim, they never

obscure, the substantial merits of the book—its comprehensiveness, completeness, fairness and soundness. The Author shows himself ever jealous for the honour of Assurance Institutions, and always, in intention, loyal to their best interests. He is earnest alike in his denunciation of irregularities within and in his exposure of delusions without, as well as honest in his eager preference for that sober moderation which in all things puts aside a present, if a doubtful, good, for a permanent, though deferred, success. The cause of Assurance cannot be the worse, it ought to be greatly the better for this work. How much it has been bettered in fact, it would be exceedingly difficult to say. After all the labour of so many able and honest men, and all the accumulated experience of both the true and the false in the practice of Assurance, it is at once a matter for surprise and mortification that there should have been brought about so small an abatement of public credulity; but, though matter for mortification, it is no matter for surprise that, the credulity remaining, official malpractice, designed to impose on it, should remain also.

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## CORRESPONDENCE.

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### ON THE VALUE OF A POLICY ON THE LONGEST OF TWO LIVES.

*To the Editor of the Journal of the Institute of Actuaries.*

SIR,—It has been demonstrated in the *Journal*, vol. xi., page 104, that the Value of the Policies existing in an Office is equal to the accumulated net Premiums less the claims. The application of this result to an ordinary Policy on a single life is shown in the formula  $\frac{N_{x-1} - N_{x+n-1}}{D_{x+n}} \cdot \frac{M_x}{N_{x-1}} - \frac{M_x - M_{x+n}}{D_{x+n}}$ , vol. xi., page 107, where  $\frac{M_x}{N_{x-1}} = \varpi_x$ .

This formula will also apply, by simply changing the values of M, N, D, and  $\varpi$ , to Policies of some other descriptions, viz., those where no alteration takes place in their status till their expiry or till claims arise on them, as for instance, Policies on Joint Lives, Endowment Assurances and Term Policies. But the formula will not be applicable, at least by a like simple modification, to the case of Policies, the status of which may be changed during their continuance, as that of Policies on the Longest of two lives, which may be changed by the dropping of one life.

I have thought a similar demonstration in the case of a Policy on the Longest of two lives to the one above referred to might not be without interest.

Let there be  $l_x$  lives of the age  $x$  and  $l_y$  of the age  $y$ , then the number of pairs which can be formed out of them, each containing a life aged  $x$  and a life aged  $y$ , is  $l_x \times l_y$ . Let this be expressed by  $l_{x,y}$ , so that in the following demonstration  $l_{x,y}$  signifies  $l_x \times l_y$ . Let each of these  $l_{x,y}$  pairs be assured for £1 payable on the last death, at an annual net Premium  $\varpi$ . Then the number of claims (that is, of pairs in which both lives become extinct) in the first year, will be  $l_{x,y} - l_{x,y+1} - l_{x+1,y} + l_{x+1,y+1}$ ; and the sum reserved at the end of the first year for existing Policies will be

$$l_{x,y}\varpi(1+i) - (l_{x,y} - l_{x,y+1} - l_{x+1,y} + l_{x+1,y+1}) \quad (1)$$

But of the latter Policies there will be  $l_{x+1,y} - l_{x+1,y+1}$ , by which only sur-